COMMONWEALTH OF AUSTRALIA

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Warning

CHARLES DARWIN UNIVERSITY

Family Name	
Given Names	
Student Number	
Teaching Period	Semester 1, 2016

FINAL EXAMINATION	**DURATION**
ENG467 – Design of Steel Structures	Reading Time: **10** minutes Writing Time: **120** minutes

INSTRUCTIONS TO CANDIDATES

If necessary make appropriate assumptions and state your assumptions

EXAM CONDITIONS

You may begin writing from the commencement of the examination session. The reading time indicated above is provided as a guide only.

This is an OPEN BOOK examination

Any non-programmable calculator is permitted

Any handwritten material is permitted

Hard copy, unannotated English translation dictionary only

ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED
Any printed material with the exception of CDU Library books	1 x 20 Page Book

THIS EXAMINATION IS PRINTED DOUBLE-SIDED.

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Q1
Calculate the minimum area required for an intermediate stiffener for a single plate stiffener.

Given: Depth of web 1000mm. Thickness of web 8 mm and spacing between stiffeners 1500mm.

(9 marks)

Q2
Explain the difference between the following bolts:

a. 8.8/S
b. 8.8/TB
c. 8.8/TF

(9 marks)

Q3
Why do we provide web stiffeners? What are the critical areas for consideration of web stiffeners?

(9 marks)

Q4
A cantilever beam 250UB31.4kg/m of 5m length carries a uniformly distributed dead load of 6kpa and a uniformly distributed live load of 4kpa. Check whether the beam satisfies the condition for deflection.

Assume $\Psi_S = 0.7$ (12 marks)

Q5
Select a universal column with a length 5.4m, in Grade 300 steel to resist a design axial force $N^* = 800kN$. Assume that for X axis both ends are pinned while for Y axis one end is fixed and the other pinned.

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(12 marks)

Q6
A Pin-ended beam-column200 UC 59.5 of 300 grade is 7m long. An axial gravity load of 500kN is applied concurrently with a lateral load of 80kN at mid-span. The member is bent about its strong axis and laterally restrained to prevent buckling.
Determine whether the design is safe.

(15 marks)

Q7
Explain the check you will do to verify the situation of combined tension and biaxial bending action in a column for section capacity.

(9 marks)

Q8
Discuss the difference in the analysis of bolt groups subjected to in plane actions and out of plane actions.

(10 marks)

Q9
Calculate the required size of fillet weld for a connection supporting a cantilever beam made out of plate of size 42 mm (d-depth) x 12 mm (b-width).The length of the beam is 180mm. It carries a load of 240N at the free end. The fixed end is welded around all four sides. Use E41XX electrodes and design for category SP welding.

Given $Z_w = bd + d^2 / 3$

(15 marks)